

Earthworms

By R. A. Oakley

Whether or not earthworms may be regarded as a beneficial factor in soil making, is beside the point. They are a nuisance on putting greens, and should be removed. The question then is, How can this best be done?

Without going into great detail, there are two outstanding efficacious treatments. One involves the use of corrosive sublimate (mercuric chlorid), the other mowrah meal, a meal made from the seed of *Bassia latifolia*, the butter-tree of India, after the oil has been pressed out. The proprietary earthworm eradicators on the market nearly all contain corrosive sublimate or mowrah meal as their active agent. There are other substances that are used for the eradication of earthworms; these will be discussed or mentioned briefly later.

From the standpoint of economy and efficiency, corrosive sublimate is without question the best substance to use to rid turf of earthworms. Furthermore, it is exceedingly efficient if properly used. But here lies the difficulty. It is quite apparent that, notwithstanding all that has been written and said with regard to the use of corrosive sublimate as an earthworm eradicator, there are many who have injured their turf by applying it improperly. Corrosive sublimate may be applied either in a water solution or mixed with sand or similar inert matter. The liquid form is regarded by many as preferable. No attempt will be made here to prescribe the most economical methods of application but some fundamental suggestions will be given so that greenkeepers and others may use them as a basis upon which to develop methods best suited to their local conditions.

Two or not to exceed 3 ounces of corrosive sublimate dissolved in 50 gallons of water are sufficient for 1,000 square feet of green. After the solution is applied it should be followed with at least twice the quantity of water to wash it thoroughly into the soil. If it is desired to apply the corrosive sublimate dry, it should be mixed at the rate of 2 or 3 ounces to 2 cubic feet of dry sand, and the mixture scattered evenly over 1,000 square feet of green. Liberal watering should follow. When corrosive sublimate is applied in the way and at the rates suggested, especially if water is used freely afterward, no injury to the turf should result. In very hot, dry times, applications as suggested may cause a very slight burning of the turf; and furthermore, it is rarely that earthworms are in action at such times. The effect of burning from the suggested rates, however, will not be lasting or serious. Sometimes ammonium chlorid or ammonium sulfate is added to the corrosive sublimate. These salts have a tendency to make the latter more soluble and to decrease its burning effect on the grass. Neither apparently increases its efficacy as an earthworm eradicator.

A number of proprietary earthworm eradicators that are sold in liquid form and which contain corrosive sublimate as the active agent, have been analyzed by the Green Section. The following are the analyses of some which the Green Section has examined:

Laboratory No. 37633.—82½ per cent corrosive sublimate; 17½ per cent ammonium chlorid.

Laboratory No. 001614.—8½ per cent corrosive sublimate; 8½ per cent ammonium chlorid; 83 per cent water.

Laboratory No. 001652.—8½ per cent corrosive sublimate; 51 per cent ammonium sulfate; 6½ per cent potassium nitrate (salt-peter); 28 per cent sodium nitrate; 6 per cent water.

Mowrah meal is a very effective earthworm eradicator provided it has not lost its original active properties by improper storage or has not been adulterated. Furthermore, it possesses some fertilizer value, although not much when applied at the rate recommended for earthworm eradication. Good unadulterated mowrah meal, in relatively recent tests at Arlington, has been effective when applied at the rate of 15 pounds to 1,000 square feet of green, if watered liberally immediately afterward. Burning of the grass may occur with heavy applications of mowrah meal, but not the slightest trace of burning has been noted from the above rate. Mowrah meal deteriorates with age, especially if stored in a damp place. It is also subject to adulteration with sand or similar inert matter. These facts should be borne in mind by the purchaser.

Other substances the effect of which has been noted on earthworms are as follows:

Bordeaux mixture when used as suggested for the treatment of brown-patch seems to be poisonous to earthworms. Putting greens dusted or sprayed frequently with the mixture are rarely much troubled with them.

Sodium cyanide applied in solution seems to poison the earthworms in the soil, but it does not bring them to the surface. Only weak solutions of this chemical may be used with safety on turf, and such solutions are not sufficiently efficacious to be recommended.

Lime-water is only partly effective, and is not recommended.

Household ammonia, or ammonium hydroxid, if sufficiently diluted to prevent burning the grass, brings earthworms to the surface, but it is not regarded as very efficacious.

Vinegar, or acetic acid, in solution gives only fair results, not sufficiently good to be regarded as worth while.

Ammonium sulfate applied as a fertilizer to putting greens will greatly reduce the prevalence of earthworms. It is said that its continued use will discourage them almost completely.

It is relatively easy to tell when earthworms are active, by the appearance of their casts on the turf. It is then that treatment should be given.

Until something better has developed, it is urged that corrosive sublimate or mowrah meal be used as here suggested. The careful and systematic use of either will give highly satisfactory results and will have a tendency permanently to lessen the earthworm problem.

Corrosive sublimate is a violent poison and due care must be exercised in its use. All packages of the poison should be conspicuously labeled. If the sand-poison mixture is made up for future use, this should be labeled also. Corrosive sublimate corrodes metals rapidly and therefore it or its solution or sand mixture should not be put into metal containers. Perhaps these warnings are unnecessary, as corrosive sublimate has long been used as a worm killer; but it is well always to remember that it is a terrible poison.

No person having any direct or indirect financial interest in the sale of any article, material, or service used in the maintenance and upkeep of golf courses shall be eligible to membership on the Green Committee of the United States Golf Association.